Instructional Strategies for Introductory Physics (ISIP) Workshop
November 3 – 5, 2011 – Austin Community College, Austin, TX

Workshop Leaders:
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Recent physics education research indicates that the "traditional" lecture-style, passive learning model does not substantially impact the learning and understanding of most students who take introductory physics. The research also indicates that most students enter introductory physics with alternative conceptions to many of the basic concepts that are taught in introductory physics. For most students, passive learning techniques generally do not replace these "misconceptions" with concepts that are more consistent with our understanding of nature. Results from physics education research have identified several different active learning techniques that have substantially increased student conceptual understanding in introductory physics.

"How can I get my students to think?" is a question asked by many faculty, regardless of their disciplines. Problem-based learning (PBL) is an instructional method that challenges students to "learn to learn," working cooperatively in groups to seek solutions to real world problems. These problems are used to engage students' curiosity and initiate learning the subject matter. PBL prepares students to think critically and analytically, and to find and use appropriate learning resources (by Barbara Duch on website: http://www.udel.edu/pbl/.)

This workshop will feature the use of one form of PBL, Very Large Contexts (VLC), in which student teams have 4-5 weeks to construct a project, collect pertinent data, create a technical instruction manual for their device and develop a multimedia presentation about their efforts. Participants will work in small groups on specific VLCs projects.

Another alternative curriculum is Spiral Physics, designed for use in both the algebra-based and calculus-based courses. Spiral Physics rearranges the traditional topic sequence so that students receive repeated exposure to concepts throughout the semester, each time with an incremental increase in complexity. Designed to facilitate active learning, it makes use of numerous alternative problem types including goal-less problem statements, ranking tasks, and an emphasis on graphing and other non-quantitative representations. The integrated text and workbook activities in Spiral Physics have been used at Monroe Community College since 1993, as well as at other institutions, and will be freely distributed at the workshop.

The workshop leaders have many years of experience in developing and refining curriculum for introductory physics students. In addition, and more importantly, the workshop leaders have had extensive experience with the implementation and adaptation of curriculum in a variety of institutions and for many types of introductory physics students along with the training of faculty in using and developing their own curricula for their technology-oriented students. This workshop is designed for TYC and HS teachers who are interested in using technology in lab and their courses to improve teaching and learning in introductory physics courses.

There will also be an opportunity to share and discuss issues relating to teaching physics more effectively (particularly for students enrolled in technician/technology education programs), and how to use various strategies, tools, and tactics to overcome problems and barriers to learning at TYCs and HSs. Important issues such as standards, assessment, diversity, and technology utilization will be addressed at various points during the workshop. Discussion and information on the needs of the technological workforce and its connection with the activities of this workshop will also be presented.

The local host will be Paul Williams of Austin Community College (ACC). The workshop will be held at ACC's central administrative offices – the Highland Business Center. ACC, located in the heart of Central Texas, is an eight campus single college district with a service area spanning eight counties. It has an enrollment of over 45,000 credit students per semester with a Physics enrollment of approximately 1200 students per semester, ranking it among the largest TYC physics programs in Texas.